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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/936,618

03/05/2002

Norio Maeda

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9087

7590 04/11/2007
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EXAMINER

LU, JIPING

ART UNIT

PAPER NUMBER

3749

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/11/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.		Applicant(s)	
	09/936,618		MAEDA ET AL.	
	Examiner		Art Unit	
	Jiping Lu		3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-12,14-19,21-24 and 26-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21 is/are allowed.
- 6) ☒ Claim(s) 1-3,5-12,14-19,22-24 and 26-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/7/2007 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 1-3, 5-12, 14-19, 22-24, 26-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claimed "the predetermined thickness being greater than zero" in claims 1, 10, 23 and 28 is deemed to be new matter. Nowhere in the specification did the applicants mention anything about the thickness of drying fluid layer being zero. The applicants are urged to point out from the specification where the "zero thickness" was mentioned or derived.

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2. Claims 1-3, 5-12, 14-19, 22-24, 26-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicants claim "the predetermined thickness being greater than zero" in claims 1, 10, 23 and 28. However, the specification failed to disclose how to determine the claimed "predetermined thickness being greater than zero". No example was given in the specification for determining the predetermined thickness being greater than zero. Without undue experiments, one skilled in the art would not be able to determine the predetermined thickness being greater than zero. To overcome this rejection, the applicant must explain as how the predetermined thickness is determined. Is there a mathematical formula? Is there a control device to automatically adjust the thickness of drying fluid layer. Is this merely a mental step?

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-3, 5-12, 14-19, 22-24 and 26-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1, 10, 23 and 28, applicants claim "the predetermined thickness being greater than zero" which is ambiguous because there is no upper limit. Nowhere in the specification did the applicants mention anything about the thickness of drying fluid layer being greater than zero. Is there any numerical range for this claimed "thickness"? A thickness "greater than zero" without upper limit is indefinite.

Claim Rejections - 35 USC § 102

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 10-12, 14, 17, 22-24, 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Ferrell (U. S. Pat. 5,653,045).

Ferrell teaches an apparatus of drying substrate comprising a processing vessel 602 for holding substrates 601 at an angle of 0 degrees with respect to vertical in the processing vessel 602, means (not numbered, see Fig. 6) for supporting substrates 601 within the processing vessel 602, means 618, 620 for continuously lowering a fluid face of the cleaning fluid 622 within the processing vessel with respect to the substrate, means 606 for introducing a drying fluid 607 under a liquid condition within the processing vessel using a nozzle 610 to form individual liquid drops of a drying fluid 607, and means 612, 614 for supplying inert gas into the processing vessel same as claimed. The drying fluid 607 was introduced at room temperature under liquid condition into processing vessel 602 onto the fluid face 622 of the cleaning fluid. The fluid face 622 of the cleaning fluid was lowered with respect to the substrate and the vessel 602 was purges with hot nitrogen. Note column 10, line 10 to column 11, line 8; column 11, lines 30-31; and Figures 6 and 6. Means 612, 614 is capable of supplying inert gas into the processing vessel during exhausting of the cleaning fluid from the processing vessel. Means 612, 614, 620, 622 is capable to continuously maintain the liquid layer of the drying fluid for continuously lowering a fluid face of the drying fluid 607 such that a liquid layer greater than a predetermine thickness (e.g. a droplet with thickness greater than zero) is continuously maintained. Claims did not define what that predetermined thickness is.

5. Claims 1, 3, 5, 7-10, 12, 14, 17, 22, 23 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Mohindra et al. (U. S. Pat. 5,772,784).

Patent to Mohindra et al. shows a method and device for drying substrates comprising housing substrates 244 within a processing vessel 240 containing DI water, supporting the substrate within the processing vessel by supporting means 248, lowering the fluid face of the DI water through drain region 231 by drain valve 236, introducing drying fluid through nozzle 306 and supplying inert gas into the processing vessel through nozzle 302, 304 during exhausting of the DI water from the processing (col. 10, lines 28-34) same as claimed. Means 231, 236, 248 is capable to continuously maintain the liquid layer of the drying fluid for continuously lowering a fluid face of the cleaning fluid DI such that a liquid layer greater than a predetermine thickness (e.g. a droplet with thickness greater than zero) is continuously maintained. Claims did not define what that predetermined thickness is.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-3, 5, 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Mohindra et al. (U. S. Pat. 5,772,784) or Mehta et al. (U. S. Pat. 4,816,081).

Ferrell teaches a method of drying substrates comprising holding substrates 601 at an angle of 0 degrees with respect to vertical in a processing vessel 602, purging vessel 602 with nitrogen, introducing a cleaning fluid 622, using low pressure nitrogen and nozzle 610 to form

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individual liquid drops of a drying fluid 607, introducing drying fluid 607 at room temperature under liquid condition into processing vessel 602 onto the fluid face 622 of the cleaning fluid, lowering the fluid face 622 of the cleaning fluid with respect to the substrate and purging the vessel 602 with hot nitrogen. Note column 10, line 10 to column 11, line 8; column 11, lines 30-31; and Figures 6 and 6. However, Ferrell does not teach supplying inert gas into the processing vessel during exhausting the cleaning fluid from the processing vessel. Mohindra et al. teach a concept of supplying inert gas into the processing vessel through nozzle 302, 304 during exhausting of the DI water from the processing (col. 10, lines 28-34) same as claimed. Mehta et al. teach a concept of supplying inert gas into the processing vessel during exhausting of the cleaning liquid from the processing vessel (col. 6, lines 24-30) same as claimed. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the substrate drying method of Ferrell to include a step of supplying inert gas into the processing vessel during exhausting of the cleaning fluid from the processing vessel as taught by Mohindra et al. or Mehta et al. in order to improve the drying efficiency. With regard to the newly added predetermined thickness, Ferrell's means 612, 614, 620, 622 is capable to continuously maintain the liquid layer of the drying fluid for continuously lowering a fluid face of the drying fluid 607 such that a liquid layer greater than a predetermine thickness (e.g. a droplet with thickness greater than zero) is continuously maintained. Claims did not define what that predetermined thickness is.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Mohindra et al. (U. S. Pat. 5,772,784) or Mehta et al. (U. S. Pat.

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4,816,081) as applied to claim 1 as above, and further in view of Fung et al. (U. S. Pat. 6,216,709).

The substrate drying method of Ferrell as modified by Mohindra et al. or Mehta et al. as above includes all that is recited in claim 6 except for a pair of supporting members with grooves for supporting the wafers at different positions. Fung et al. teaches substrate holders 12 and 24 with grooves for supporting the substrates in multiple positions and to reduce water spots left on the substrates after drying. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the drying method of Ferrell to include a step of supporting the substrates at multiple positions as taught by Fung et al. in order to improve the drying efficiency.

9. Claims 15-16, 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Fung et al. (U. S. Pat. 6,216,709).

The substrate drying device of Ferrell as above includes all that is recited in claims 15-16 and 26-27 except for a pair of supporting members with grooves for supporting the wafers at different positions. Fung et al. teaches substrate holders 12 and 24 with grooves for supporting the substrates in multiple positions and to reduce water spots left on the substrates after drying. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the substrate holders 12 and 24 of Fung et al. for the substrate support member of Ferrell in order to support substrates in multiple positions and to reduce water spots left on the substrate after drying.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Takase et al. (U. S. Pat. 6,152,153).

The substrate drying device of Ferrell as above includes all that is recited in claim 18 except for moving the nozzle closer to the substrate after it has been removed from the cleaning solution. Takase et al. teaches a concept of moving the nozzles across and toward the substrate for more precise directing of the drying fluid (col. 10, lines 42-63 and Figures 9 and 10).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the drying device of Ferrell to include moving nozzles as taught by Takase et al. in order to more precise directing of the drying fluid and to improve the drying efficiency.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Taniyama et al. (U. S. Pat. 6,247,479).

The substrate drying device of Ferrell as above includes all that is recited in claim 19 except for the circulation means for the liquid components. Taniyama et al. teaches a concept of using circulation means for keeping liquids for substrate treatment purified and leading to less contaminants on the finished substrate (co. 7, lines 27-49 and Figure 4). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the drying device of Ferrell to circulation means as taught by Taniyama et al. in order to keep liquids for substrate treatment purified and to reduce contaminants on the finished substrate.

Allowable Subject Matter

12. Claim 21 is allowed.

Response to Arguments

13. Applicant's arguments filed 03/07/2007 have been fully considered but they are not persuasive to overcome the rejection. First, claims fail to define over the prior art references. Please point out from the claims, if there is any limitation that the prior art references do not show or teach. Second, it appears to be applicants' intention to rely on the "predetermined thickness being greater than zero" for patentability. Therefore, the applicants are required to establish the criticality of claimed "predetermined thickness being greater than zero" which will produce new and unexpected results over the prior art references as applied under 35 USC 102/103. Lastly, the examiner hereby incorporates by reference with the rebuttals made in the final rejection mailed 5/17/06.

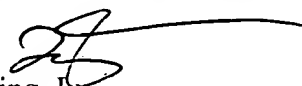
Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jiping Lu whose telephone number is 571 272 4878. The examiner can normally be reached on Monday-Friday, 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KENNETH RINEHART can be reached on 571 272-4881. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jiping Lu
Primary Examiner
Art Unit 3749

J. L.